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 **wwett** **SHOW**
Water & Wastewater Equipment,
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Only the *Best*

**GARRY HOUSTON AND HIS
TEAM GET THE MOST FROM A
MICROFILTRATION WATER PLANT**

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The creative profession**

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Natural pest control**

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Big benefits from a filter change**

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Garry Houston
Senior Plant Operator
Abilene, Texas



top performer

wastewater:

BIOSOLIDS



Compost is processed to remove larger wood pieces before being considered final product.

Stepping Up in Class

A PLANT UPGRADE IN MECHANICSBURG INCLUDED A SWITCH FROM CLASS B BIOSOLIDS TO PRODUCING AND MARKETING CLASS A COMPOST AS A SOIL ADDITIVE

STORY: **David Steinkraus**

PHOTOGRAPHY: **James Robinson**

LANDFILL SPACE WAS AT A PREMIUM. LAND APPLICATION of Class B biosolids faced public skepticism and rising costs. So the Mechanicsburg (Pennsylvania) Sewer Department turned to producing Class A compost.

In the bargain, the department erased its landfill costs and now markets its biosolids product to the public as a soil additive. It all happened without the addition of staff and with a relatively small investment in equipment.

The composting operation took advantage of a supply of wood waste available nearby. The end product is sold in bulk to a landscaper and to the general public for \$10 per cubic yard, enough to offset administrative costs.

Branded Waste-No-More after a public naming contest that drew 26 entries, the compost has been well accepted. The department received a 2015 Beneficial Use of Biosolids Award from the Pennsylvania Water Environment Association.

UPGRADING THE PROCESS

The 2 mgd (design) Mechanicsburg Wastewater Treatment Plant uses the modified Ludzack-Ettinger (MLE) secondary treatment process. Before entering that process, the wastewater passes through an aerated grit-removal system and trickling filters (both from Envirodyne Systems). Effluent is discharged

Mechanicsburg (Pennsylvania) Wastewater Treatment Plant

COMMISSIONED: | 1950

POPULATION SERVED: | 14,000

FLOWS: | 2 mgd design, 1 mgd average

BIOSOLIDS PROCESS: | Anaerobic digestion and static pile windrow composting

BIOSOLIDS VOLUME: | 140-150 dry tons per year

BIOSOLIDS USE: | Soil enhancement

WEBSITE: | www.mechanicsburgborough.org/sewer

GPS COORDINATES: | Latitude: 40°12'42.37"N; longitude: 77° 1'30.51"W



to a tributary of the Susquehanna River, which feeds the Chesapeake Bay.

The Mechanicsburg plant faced major renovations to comply with strict nitrogen limits in keeping with the Chesapeake Bay Initiative. Ron Adams, plant superintendent, decided to revisit the biosolids process at the same time. The contractor handling biosolids hauling for the borough had to travel increasing distances, 15 miles or more, to landfills that would accept the material as cover or to farmland where solids could be applied.

“ We just build the piles now, and it’s easy.
But it was hard at first because we had to come up
with the right recipe and the correct amount of air.”

RON ADAMS

Rodney Westhafer operates
a specialty truck (Roto-Mix)
which mixes biosolids with
wood waste and builds
piles where it
can cure.





The 2 mgd (design) Mechanicsburg Wastewater Treatment Plant serves a population of about 14,000.

“ I’ve worked here so long I’m nose blind, and I needed independent verification. We may be a wastewater treatment plant, but we don’t get a lot of odor complaints, and I want to keep it that way.”

RON ADAMS

TRIAL AND ERROR

“Starting a biosolids composting project is more art than science,” says Ron Adams, superintendent of the Mechanicsburg (Pennsylvania) Sewer Department. “We just build the piles now, and it’s easy. But it was hard at first because we had to come up with the right recipe and the correct amount of air.”

The Mechanicsburg team started by attending conferences, reading and talking to consultants at Material Matters of Elizabethtown, Pennsylvania. They ran a scale model experiment to ensure that the process would work, but the full-scale project still required about six months of fine-tuning, and even that required some instinct.

For each pile, technicians mix one-third biosolids, one-third fresh woody waste, and one-third older woody waste, screened to remove small pieces. The larger pieces improve air flow.

At first, the piles didn’t work: They would come up to tempera-

ture and then cool off. “We were looking at all the possibilities: whether it was some kind of inhibition from a chemical, or not enough nitrogen,” says Adams. “Finally it came down to a gut feeling. I said I wanted to try a pile where we don’t add any air.”

It worked, because too-frequent use of a blower in previous piles provided too much oxygen; bacteria used up all the food in too short a time. “With or without the blower, you still have convection operating,” says Adams. “Think of a chimney. What’s happening here is that as the pile heats, it draws air through the covering blanket of woody waste and through the blower system even when that isn’t on.”

Now the blower is attached to a simple timer that turns it on for about 10 seconds every two hours. The piles heat up and hold temperatures for days as they should.

Most of the raw material for biosolids production comes from the primary clarifiers. Solids are pumped to gravity thickeners and then into the anaerobic digester. Digestion produces about 10,000 to 15,000 cubic feet of biogas per day. About one-third of that is used to heat the digester. In summer the balance is flared, and in winter it is used to heat plant buildings. Solids leaving the digester are dewatered in belt presses (Ashbrook Simon-Hartley), yielding 140 to 150 dry tons per year (1,000 tons of cake).

THE EASY CHOICE

It was easy access to wood waste that inspired Adams to look at composting. Next to the treatment plant is a yard waste composting site run by Silver Spring Township and Mechanicsburg, and created with the encouragement of the state, which emphasizes all forms of recycling to reduce reliance on landfills.

A specialty truck (Roto-Mix) first moves the Mechanicsburg solids to the composting site to pick up wood waste. It then heads to the hoop barn, where the biosolids compost piles are built. A key step for Adams and his team was to make sure the composting plan would work. "We had wood waste, but we couldn't say for certain that because someone's wood waste would work, our wood waste would work," he says.

It was critical for the process to work year-round, even through the winter. So a couple of years ago, starting in October and stretching into November, plant team members tested the process. They bought a blower, laid piping, built a small-scale pile, and watched what happened. As long as they put a blanket of wood waste on the outside of the pile, the internal temperatures met state requirements. The blanket thickness varies. In summer, six inches is enough, but in winter it takes a foot to keep internal temperatures acceptable.

Adams also went to the borough office and asked administrative assistants to visit the experimental pile and judge the odor. "I've worked here so long I'm nose blind, and I needed independent verification," he says. "We may be a wastewater treatment plant, but we don't get a lot of odor complaints, and I want to keep it that way."

COST CONTROLS

A key goal for the composting project was to hold the number of personnel steady. The Mechanicsburg plant operates with a staff of eight: Adams and assis -



A specialty truck (Roto-Mix) is loaded with biosolids to which wood waste is later added.

tant superintendent Curtis Huey; Jeff Bricker, head operator; Frank Guswiler, collections system operator; Vanessa Moore, lab technician; and technicians Mark Wills, Rod Westhafer and Jim Boyer.

The one major piece of equipment the department purchased for composting was the Roto-Mix truck. Before composting began, the belt press fed cake into dump trucks. "The operator who used to run the belt press and drive the dump truck now runs the belt press and drives the compost truck," Adams says. "We got rid of the dump truck and bought a Roto-Mix."

Inside the truck box are mixing paddles and an auger that feed a conveyor chute. The operator picks up a load of biosolids and drives to the yard waste site to add woody material. While he drives to the composting barn, the paddles mix the load. Inside the barn, he engages the auger and drives slowly across the floor to build a pile. The exterior blanket of wood particles is added with a front-end loader.

(continued)

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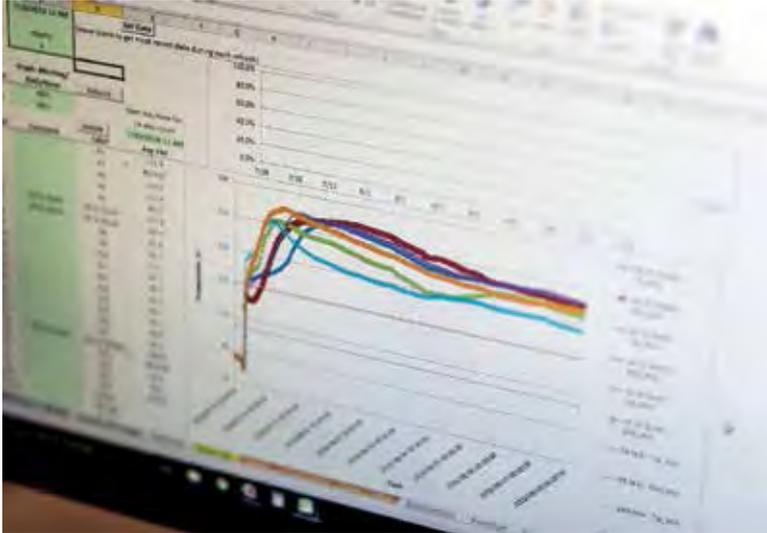


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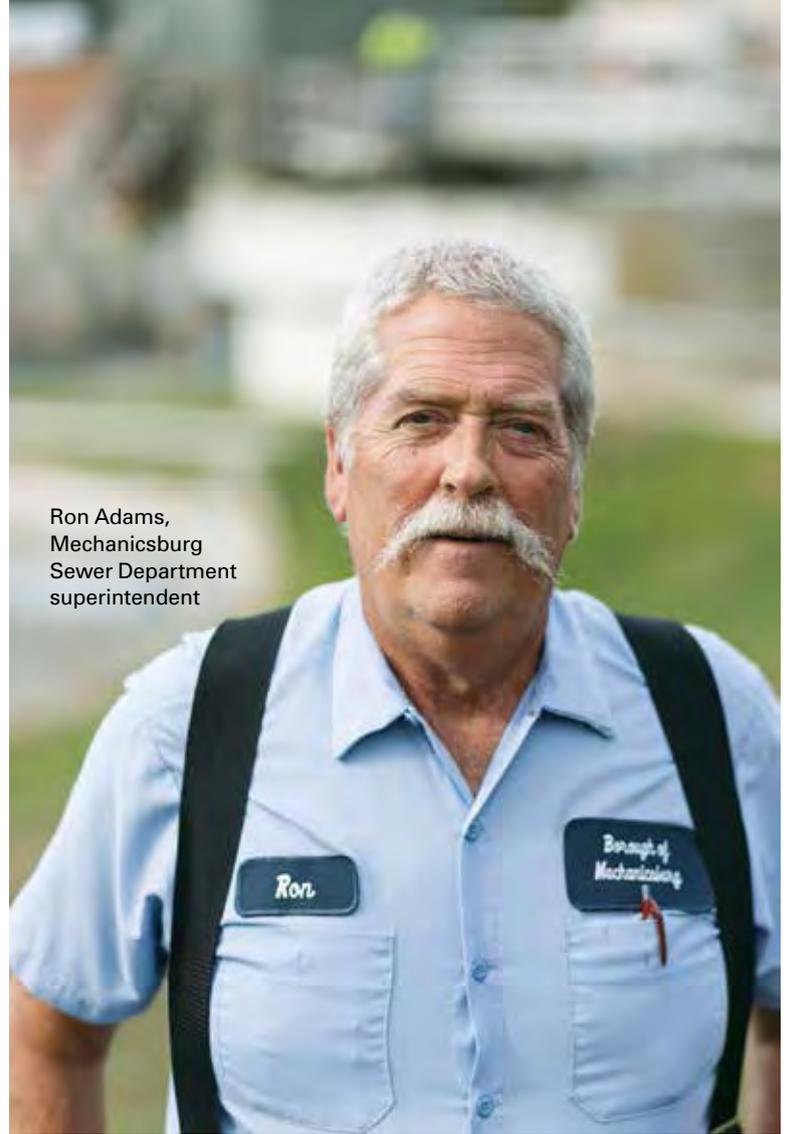
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The Mechanicsburg Wastewater Treatment Plant produces 140 to 150 dry tons of biosolids per year.



The internal temperatures of the compost piles are monitored automatically.



Ron Adams,
Mechanicsburg
Sewer Department
superintendent

“By buying this equipment we don’t have to mix, and we don’t have to build piles by hand because this truck does all that for us,” Adams says.

To kill pathogens, Pennsylvania rules say the temperature in a compost pile must exceed 131 degrees for three days; over 14 days it must be warmer than 104 and average 113 degrees. Mechanicsburg piles are above 131 degrees for all 14 days and have an average temperature of 150 degrees. Independent lab analysis confirms the absence of pathogens.

YOU BUY IT, YOU HAUL IT

When the finished material comes out of the composting barn, it is sold to the public in bulk; bagging is not feasible. Most of the product goes to a landscaper, but residents also take it to apply to lawns and gardens. “We’ve sold every pound we’ve made of the composted biosolids, and our landfill costs have dropped to zero,” Adams says.

The product naming contest helped raise public awareness of the new product and engage people in the project. The Waste No More name was submitted by resident George Elliot; as a prize he received a truckload of product delivered by borough Mayor Jack Ritter. Elliot and the next top four award winners in the contest received garden tools and a product sample.

After the naming contest, Adams took advantage of the annual Earth Day celebration on the town square. He took burlap bags of Waste-No-More and set up next to a group handing out tree seedlings. As people passed him, he handed them samples and advised them to mix it with the soil when they planted the tree. At the end of the day, all the samples were gone. After that, marketing took care of itself through word-of-mouth.

“// We’ve sold every pound we’ve made of these composted biosolids, and our landfill costs have dropped to zero.”

RON ADAMS

PART OF A TREND

There’s a trend toward Class A biosolids in Pennsylvania. Some treatment plants use composting while others are shifting to thermal drying and pelletizing. “We’re not cutting edge, but then we’re not lagging behind either,” Adams says.

The Mechanicsburg biosolids equipment is sized to meet the treatment plant’s design capacity. Since the plant’s average flow is now about half the design flow, capacity exists to accept outside waste for processing. Adams isn’t moving in that direction.

“We’re in a good place, and we’re not in competition with anyone,” he says. “This is the advantage of being a borough. We can look ahead 20 years when making an investment like this because we don’t have to turn a profit in two years or go out of business.” **tpo**

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